

Specification for

# Magnetic tape cassette and cartridge labelling and file structure, for information interchange —

## Part 1: Label standard version 1

[ISO title: Information processing — Magnetic tape cassette and cartridge labelling and file structure for information interchange]

UDC 681.327.64.05:006.015.3

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

# Cooperating organizations

The Data Processing Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- British Computer Society Limited\*
- British Paper and Board Industry Federation (PIF)
- British Printing Industries Federation
- Business Equipment Trade Association\*
- Central Computer Agency (Civil Service Department)\*
- Committee of London Clearing Bankers on behalf of the Committee of Scottish Clearing Bankers, Co-operative Bank, Central Trustee Savings Bank and Yorkshire Bank\*
- Department of Industry (Computers Systems and Electronics)
- Department of Industry (National Physical Laboratory)
- Electricity Supply Industry in England and Wales
- Government Communications Headquarters
- HM Customs and Excise
- Institute of Cost and Management Accountants
- Institute of Purchasing and Supply
- Institution of Electrical Engineers
- Institution of Mechanical Engineers
- Inter-university Committee on Computing
- London Transport Executive\*
- Ministry of Defence\*
- National Computer Users' Forum
- National Computing Centre Limited\*
- National Research Development Corporation
- Post Office\*
- Society of British Aerospace Companies Limited

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- Association of County Councils
- Association of Metropolitan Authorities
- Association of District Councils
- British Insurance Association
- Inter-bank Research Organisation
- Library Association

This British Standard, having been prepared under the direction of Data Processing Standards Committee, was published under the authority of the Executive Board and comes into effect on 28 September 1979

© BSI 12-1999

The following BSI references relate to the work on this standard:  
Committee reference DPS/11  
Draft for comment 76/61733 DC

ISBN 0 580 10911 9

## Amendments issued since publication

| Amd. No. | Date of issue | Comments |
|----------|---------------|----------|
|          |               |          |
|          |               |          |
|          |               |          |
|          |               |          |
|          |               |          |

# Contents

|                                                                | Page               |
|----------------------------------------------------------------|--------------------|
| Cooperating organizations                                      | Inside front cover |
| National foreword                                              | ii                 |
| 0 Introduction                                                 | 1                  |
| 1 Scope and field of application                               | 1                  |
| 2 References                                                   | 1                  |
| 3 Definitions                                                  | 1                  |
| 4 Basic system                                                 | 2                  |
| 4.1 Introduction                                               | 2                  |
| 4.2 Use of tape marks                                          | 2                  |
| 4.3 Structuring the files                                      | 2                  |
| 4.4 Coincidence of end of file and intermediate start of track | 3                  |
| 4.5 Coincidence of end of file and intermediate end of track   | 3                  |
| 4.6 End of available space                                     | 3                  |
| 4.7 Recording density                                          | 3                  |
| 4.8 By-pass or check-point records                             | 3                  |
| 5 Compact system                                               | 3                  |
| 5.1 Introduction                                               | 3                  |
| 5.2 Use of tape marks                                          | 3                  |
| 5.3 Formats and contents of labels                             | 4                  |
| 5.4 Processing of label fields                                 | 5                  |
| 5.5 Structuring the files                                      | 6                  |
| 5.6 Recording density                                          | 8                  |
| 5.7 By-pass or check-point records                             | 8                  |
| 6 Extended system                                              | 8                  |
| 6.1 Introduction                                               | 8                  |
| 6.2 Use of tape marks                                          | 8                  |
| 6.3 Formats and contents of labels                             | 8                  |
| 6.4 Processing of label fields                                 | 9                  |
| 6.5 Structuring the files                                      | 9                  |
| 6.6 Use of optional labels                                     | 11                 |
| 6.7 Recording density                                          | 11                 |
| 6.8 By-pass or check-point records                             | 11                 |
| Figure 1 — File structure                                      | 3                  |
| Figure 2 — File structure — Special cases                      | 3                  |
| Figure 3 — Single-volume file structure                        | 6                  |
| Figure 4 — Multi-volume file structure                         | 6                  |
| Figure 5 — Empty file section at intermediate start of track   | 7                  |
| Figure 6 — Empty file section at start of continuation volume  | 7                  |
| Figure 7 — Empty file section at intermediate end of track     | 7                  |
| Figure 8 — Empty file section at end of volume                 | 7                  |
| Figure 9 — Single-volume file structures                       | 10                 |
| Figure 10 — Multi-volume file structures                       | 10                 |
| Figure 11 — Empty file section at intermediate start of track  | 10                 |
| Figure 12 — Empty file section at intermediate end of track    | 11                 |
| Table — Classification of labels                               | 4                  |
| Publications referred to                                       | Inside back cover  |

# National foreword

Part 1 of this British Standard is identical with ISO 4341 “*Information processing — Magnetic tape cassette and cartridge labelling and file structure for information interchange*” published by the International Organization for Standardization (ISO). Further versions of ISO 4341 are likely to be prepared and the intention is that they will be implemented in the UK as further Parts of this standard. Changeover from each label standard version to the next version may be made easier by allowing consecutive Parts of this standard to coexist for a time.

**Terminology and conventions.** The text of the International Standard has been approved as suitable for publication, without deviation, as a British Standard. Some terminology and certain conventions are not identical with those used in British Standards; attention is especially drawn to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

**Cross-references**

| International Standard | Corresponding British Standard                                                                                                                                      |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO 646:1973           | BS 4730:1974 <i>The United Kingdom 7-bit data code (ISO-7-UK)</i><br>(Technically equivalent)                                                                       |
| ISO 1001:1979          | BS 4732 <i>Magnetic tape labelling and file structure for data interchange</i><br>Part 2:1979 <i>Label standard version 3</i>                                       |
| ISO 3407:1976          | BS 5079 <i>3.81 mm magnetic tape in a cassette for data interchange</i><br>Part 1:1974 <i>Tape recorded at 31.5 bits per millimetre, phase encoded</i><br>(Related) |

NOTE 1 BS 4730 is fully in conformity with ISO 646 which allows for national versions.  
NOTE 2 BS 5079-1:1974 and ISO 3407:1976 are very closely related; in particular, they are technically equivalent regarding use of tracks (see clause 3 of this standard).  
NOTE 3 Although the reference to ISO 3275:1974 is not essential to the operation of this standard, it may be noted that ISO 3275 is technically equivalent to the relevant content of BS 5079-1:1974.  
A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

**Summary of pages**

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.  
This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 0 Introduction

The aim of this International Standard is to make possible the interchange of information recorded on magnetic tape cassettes and cartridges between different users and different data processing and data capture equipment. This is accomplished by the arrangement of magnetically recorded separators and labels, to structure and identify the files.

To provide for the wide range of equipment and applications using magnetic tape cassettes, three systems of increasing complexity are specified. It is possible to distinguish between the three systems by reading the first block recorded on a particular volume.

In order that a cassette which carries more sophisticated labelling may be copied on unsophisticated equipment, the terminating conditions for end of track and end of data within a cassette are identical in all three of these systems. Thus, support of the basic system is a necessary requirement to ensure data interchangeability from simple data preparation devices to more complex data processing systems.

The third system is provided only for use in the most sophisticated environment, where ISO 1001 for magnetic tape labelling is already employed.

Throughout the whole of this International Standard, the use of the 7-bit coded character set specified in ISO 646 is implied.

**NOTE** Whenever the word "cassette" is used, the word "cartridge" is also implied. It is felt that the illustrations and examples given for cassettes can readily be interpreted to cover similar situations for multi-track cartridges.

## 1 Scope and field of application

This International Standard specifies file structures for data interchange on magnetic tape cassettes.

To provide for the range of sophistication in equipment and applications, three systems are specified:

- a) the *basic* system, employing only hardware-defined separators to structure the files;
- b) the *compact* system, employing special data blocks with information content (labels), which are capable of being recorded using only numeric equipment;
- c) the *extended* system, employing the magnetic tape labelling system specified in ISO 1001 together with new labels, to define a more comprehensive labelling system.

This International Standard is not limited to the 3,81 mm magnetic tape cassette described in ISO 3407 but could also be applied to higher capacity cassettes or cartridges.

## 2 References

ISO 646, *7-bit coded character set for information processing interchange*.

ISO 1001, *Information processing — Magnetic tape labelling and file structure for information interchange*.

ISO 3275, *Information processing — Implementation of the 7-bit coded character set and its 7-bit and 8-bit extensions on 3,81 mm magnetic tape cassette for data interchange*.

ISO 3407, *Information processing — 3,81 mm (0.150 in) magnetic tape cassette for information interchange, 32 bpmm (800 bpi), phase encoded*.

## 3 Definitions

For the purposes of this International Standard the following terms have the meanings indicated.

**NOTE** For a better explanation, the concepts have, where appropriate, been listed separately as logical and physical. The definition of a term that is used in an International Standard related to this subject conforms to its usage in that International Standard; the definition of a term that is in common use in a context related to this International Standard conforms to that common usage.

### label

a block, at the beginning or at the end of a volume, of a track or of a file, that identifies, characterizes and/or delimits that volume, track or file. A label is not considered to be part of a file

### label identifier

one or more characters recorded in the label to identify the label

### characters used in a label

only a subset of the characters of the 7-bit code defined in ISO 646 is used in the label. The allowable characters are described in the following way:

- "n" characters: any numeric character from 0 to 9.
- "a" characters: any numeric, alphabetic or special character of the centre four columns of the code table except position 5/15 and those positions where there is provision for alternative graphic representation.

### tape mark

a delimiter used to indicate the boundary between file data and labels, and also between certain labels. In the *basic* system it is used to separate files

NOTE 1 The tape mark configuration is specified in the relevant International Standard for data interchange on magnetic tape cassettes.

NOTE 2 Throughout this International Standard the tape mark is indicated as an asterisk (\*).

| Logical                                                                                                                                                                                                                                                                                                                                 | Physical                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>record:</b> Related data treated as a unit of information.                                                                                                                                                                                                                                                                           | <b>block:</b> A group of contiguously recorded characters written or read as a unit, and terminated with an interblock gap.                                                                                                                                                                                                                                                                                                |
| <b>file:</b> A collection of information consisting of records pertaining to a single subject<br><br><i>Examples:</i> In the context of business data, a payroll file, an inventory file.<br>— The delineation of a file may be arbitrary.<br>— A file may be recorded on all or part of a track or volume, or on more than one volume. | <b>volume:</b> A dismountable physical unit of storage media, for example a complete cassette consisting of either<br><br>— two tracks used serially and sequentially for data interchange as specified in ISO 3407 or<br><br>— a single track (number 1, side A) used serially for data interchange with the use of track number 2, side B, defined by agreement between the interchange parties as specified in ISO 3407 |
| <b>file section:</b> That part of a file that is recorded on a single track of a cassette.<br><br>— The sections of a file in a volume shall not have sections of other files interspersed.                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>file set:</b> A collection of one or more related files, recorded consecutively on a volume set.                                                                                                                                                                                                                                     | <b>volume set:</b> A collection of one or more volumes on which one and only one file set is recorded.                                                                                                                                                                                                                                                                                                                     |

**double tape mark**  
a delimiter consisting of two consecutive tape marks that is used to indicate the end of a volume or of a file set

NOTE Except in the *basic* system, two consecutive tape marks also occur when an empty file section or an empty file exists on a volume, in which case they are not interpreted as a double mark but rather as two single tape marks framing an empty file section. In this context “empty” means that no blocks are present between the tape mark following the header label and the tape mark preceding the end of volume, end of track or end of file label of that file section or file.

4 Basic system

4.1 Introduction

The *basic* system permits the structuring of one or more files on one volume by means of hardware separators (tape marks) only. Each volume is independent; multi-volume files are not provided. No magnetically recorded labels are used.

The procedures for recording and detecting end of data on a track are defined in the relevant International Standards for media.

4.2 Use of tape marks

Tape marks are used with the following significance to indicate the structure of volumes and files.

|                                   |       |
|-----------------------------------|-------|
| — Start of volume                 | ...*  |
| — File separator                  | ...*  |
| — Intermediate end of track       | ...*  |
| — Intermediate start of track     | ...*  |
| — End of data (and end of volume) | ...** |

It is not permitted for one file separator to be immediately followed by another since this signifies end of data; thus, there can be no empty file sections as described in the definition of “double tape mark” in clause 3.

Two tape marks not signifying end of data may occur when an intermediate start of track is immediately followed by a file separator: this condition is explained in 4.4 and 4.5.

4.3 Structuring the files

Figure 1 illustrates the use of tape marks to establish the file structure according to the definitions of 4.2. In this figure and Figure 2, the beginning of the tape is at the left and the end of the track is at the right. Each box represents a track.

If the end-of-tape marker is encountered whilst a data block is being written, then, unless the system avoids the situation by, for example, erasing the current block, the system will complete writing the data block, and will then close the track with an intermediate end of track tape mark. The next track is opened with an intermediate start of track tape mark [as illustrated in Figure 1 b) and Figure 1 d)], and the file is continued.